IFW
AF/3745

OIPE IAP2
APR 28 2006
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/677,870 Confirmation No. : 9828
First Named Inventor : Masamichi IKETANI
Filed : October 3, 2003
TC/A.U. : 3745
Examiner : C. M. Verdier
Docket No. : 038920.50634D1
Customer No. : 23911

Title : Seal Apparatus for a Water Pump, Rotation-Support Apparatus for a Water Pump, and a Water Pump

AMENDED APPEAL BRIEF TRANSMITTAL

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

An amended Appeal Brief fully in compliance with both the provisions of 37 C.F.R. § 41.37 and the requirements set forth in the communication from the Examiner dated April 11, 2006 is attached.

If there are any questions regarding this document or the application in general, a telephone call to the undersigned would be appreciated.

If necessary to effect a timely response, this paper should be considered as a petition for an extension of time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #038920.50634D1).

Respectfully submitted,

April 28, 2006

Jeffrey D. Sanok
Registration No. 32,169
Richard R. Diefendorf
Registration No. 32,390

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
JDS:RRD:rd

OIPE IAP2
APR 28 2006
PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No. : 10/677,870 Confirmation No. : 9828
First Named Inventor : Masamichi IKETANI
Filed : October 3, 2003
TC/A.U. : 3745
Examiner : C. M. Verdier
Docket No. : 038920.50634D1
Customer No. : 23911

Title : Seal Apparatus for a Water Pump, Rotation-Support Apparatus for a Water Pump, and a Water Pump

AMENDED APPEAL BRIEF

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

By way of a Notice of Appeal filed on December 8, 2005, this appeal is made to the Board of Patent Appeals and Interferences from the second rejection of claims 4-6 in the Office Action dated June 14, 2005. The following is an amended Appeal Brief submitted pursuant to 37 C.F.R. § 41.37 and the requirements set forth in the communication from the Examiner dated April 11, 2006.

REAL PARTY IN INTEREST

The real party in interest is NSK Ltd. of 6-3, Ohsaki 1-chome, Shinagawa-ku, Tokyo, Japan, by way of an Assignment executed in connection with grandparent application serial no. 09/989,520 and recorded in the U.S. Patent and Trademark Office Assignment records on November 21, 2001, at reel 012318, frame 0061.

RELATED APPEALS AND INTERFERENCES

No interferences, judicial proceedings, or other appeals which are related to, directly affect, are directly affected by, or have a bearing on a decision in the present appeal are known.

STATUS OF CLAIMS

Claims 4-6 are present in the application, are rejected, and are appealed. Claims 1-3 are canceled.

STATUS OF AMENDMENTS

No amendments subsequent to the second rejection of claims 4-6 set forth in the Office Action dated June 14, 2005, have been filed.

SUMMARY OF CLAIMED SUBJECT MATTER

A concise explanation of the subject matter defined by the claims involved in this appeal will now be provided. This explanation refers, by way of example only and without intending to limit the claims, to certain drawing figures and to paragraph and line numbers of the substitute specification filed October 3, 2003.

Reference is initially made to Figures 1-3. In one embodiment of the invention defined by claim 4, a seal apparatus for a water pump is provided between a non-rotating member (outer ring) 16 having an inner peripheral surface and a rotating shaft 3a inserted into the non-rotating member 16 and having an outer peripheral surface (see, for example, lines 1-6 in paragraph

0028). The seal apparatus includes a seal ring 13 having an outer peripheral edge fastened within an attachment groove 19 to the inner peripheral surface of the non-rotating member 16 (see, for example, lines 11-15 in paragraph 0028).

A slinger 14 made from a metal plate is provided (see, for example, lines 1-7 in paragraph 0027 and lines 3-4 in paragraph 0031). The slinger 14 is fitted around the rotating shaft 3a between the inner peripheral surface of the non-rotating member 16 and the outer peripheral surface of the rotating shaft 3a (see, for example, lines 1-3 in paragraph 0031), and has an outer peripheral edge formed with an outer-diameter-side cylindrical section 26 which is concentric with the rotating shaft 3a and has an outer peripheral surface (see again, for example, lines 8-14 in paragraph 0031).

Another embodiment of the invention, defined by claim 5, concerns a rotation-support apparatus for a water pump as defined by claim 5 (see, for example, lines 1-2 in paragraph 0001, lines 1-6 in paragraph 0014, and lines 8-13 in paragraph 0027). The apparatus includes an outer ring 16 having an inner peripheral surface formed with an outer ring raceway 17, a rotating shaft 3a for the water pump having an outer peripheral surface formed with an inner ring raceway 18, and a plurality of rolling elements 15 rotatably located between the outer-ring raceway 17 and the inner-ring raceway 18 (see, for example, lines 1-6 in paragraph 0028). The apparatus includes a seal ring 13 having an outer peripheral edge fastened, by way of an attachment groove 19, to the inner peripheral surface of the outer ring 16 at one end thereof (see, for example, lines 6-17 in paragraph 0028). A slinger 14, made from a metal plate and formed by bending, is provided (see, for example, lines 1-14 in paragraph 0031). The slinger 14 has an outer peripheral surface (see Figure 1), is fitted around the rotating shaft 3a, and has an outer peripheral edge formed with an outer-diameter-side cylindrical section 26 which is concentric with the rotating shaft and has an outer peripheral surface (see again, for example, lines 8-14 in paragraph 0031).

The invention additionally concerns a water pump comprising a housing having an inner peripheral surface as defined by claim 6 (see again, for example, lines 1-2 in paragraph 0001, lines 1-18 in paragraph 0015, and lines 8-13 in paragraph 0027). The water pump includes an outer-ring raceway 17 that is either formed directly (not shown) around the inner peripheral surface of the housing or formed around a separate outer ring 16 around the inner peripheral surface of this housing (see, for example, lines 1-4 in paragraph 0015). A rotating shaft 3a has an outer peripheral surface formed with an inner-ring raceway 18, and a plurality of rolling elements 15 are rotatably located between the outer-ring raceway 17 and the inner-ring raceway 18 (see, for example, lines 1-6 in paragraph 0028). The water pump further includes a seal ring 13 having an outer peripheral edge fastened by way of the attachment groove 19 to the inner peripheral surface of the outer ring 16 at one end thereof (see, for example, lines 6-17 in paragraph 0028). A slinger 14 made from a metal plate and formed by bending is provided (see, for example, lines 1-7 in paragraph 0027 and lines 3-11 in paragraph 0031). The slinger 14 has an outer peripheral surface (Figure 1) and is fitted around the rotating shaft 3a (see, for example, lines 1-3 and 8-14 in paragraph 0031).

As is apparent from lines 8-13 in paragraph 0027 and from Figure 6, in a water pump as defined by claim 6, a pulley such as pulley 8 in Figure 6 is fastened to the rotating shaft 3a at an outer end thereof, while an impeller such as impeller 9 in Figure 6 is fastened to the rotating shaft 3a at an inner end thereof (see, for example, lines 10-14 in paragraph 0015). A mechanical seal such as seal 10 in Figure 6 is provided between the inner peripheral surface of the housing 1 and the outer peripheral surface of the rotating shaft 3a and axially between the impeller, such as the impeller 9 of Figure 6, and the slinger 14. As is apparent from Figure 6 when considered in conjunction with Figures 1-3, for example, a space is provided axially in this configuration between the mechanical seal such as seal 10 in Figure 6 and the seal ring 13.

In the invention as defined by each of claims 4-6, the seal ring 13 includes a first seal lip 22 coming in sliding contact with either the outer peripheral surface of the rotating shaft 3a (Figures 1-4) or with the outer peripheral surface of the slinger 14a that rotates together with that rotating shaft 3a (Figure 5) (see, for example, lines 2-5 in paragraph 0029 and lines 9-15 in paragraph 0043).

In order to improve seal performance, the seal ring has a second seal lip 23 including a tip edge coming in sliding contact with an outer peripheral surface of the outer-diameter-side cylindrical section 26 and tilted inward in the radial direction toward the tip edge thereof (see, for example, lines 1-3 and 8-10 in paragraph 0030). This configuration suppresses a tendency for gaps to occur between the tip edge of the second seal lip 23 and the outer peripheral surface of the outer-diameter-side cylindrical section 26 (see, for example, lines 7-12 in paragraph 0035), while promoting the circumferential discharge of foreign matter discussed, for example, in lines 9-17.

The amount of elastic deformation of the second seal lip 23, which occurs when the tip edge of the second seal lip comes in contact with the outer peripheral surface of the outer-diameter-side cylindrical section 26, is at least 1/10 and up to 7/10 the height of the second seal lip in a free state (see, for example, lines 1-8 in paragraph 0032). This configuration prevents the contact pressure at the area of sliding contact between the tip edge of the second seal lip 23 from becoming excessively large as discussed in paragraph 0040. Finally, the roughness of a section of the outer peripheral surface of the outer-diameter-side cylindrical section 26 with which the tip edge of the second seal lip 23 comes in sliding contact is either from 0.2 μm to 2.0 μm in arithmetic mean Ra or from 0.8 μm to 8.0 μm in maximum height Ry (see, for example, lines 1-7 in paragraph 0041). This construction prevents the tip edge from rubbing forcibly against the outer peripheral surface of the section 26, and minimizes tip edge wear as discussed in paragraph 0041.

GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The sole ground of rejection presented for review in this appeal is whether claims 4-6 are unpatentable under 35 U.S.C. § 103(a) over Japanese publication 9-21396 to Nobuhiko et al. in view of U.S. Patent 6,682,076 to Hosoda et al., any one of U.S. Patent 5,056,799 to Takenaka et al., U.S. Patent 4,155,560 to Repella, and published U.S. Patent application 2003/0189293 to Johnen, and Japanese publication 10-331,985.

ARGUMENT

Rejection under 35 U.S.C. § 103(a) over Japanese publication 9-21396 to Nobuhiko et al. in view of U.S. Patent 6,682,076 to Hosoda et al., any one of U.S. Patent 5,056,799 to Takenaka et al., U.S. Patent 4,155,560 to Repella, and published U.S. Patent application 2003/0189293 to Johnen, and Japanese publication 10-331,985

Claims 4-6

The rejection of claims 4-6 under 35 U.S.C. § 103(a) as being unpatentable over the documents mentioned is erroneous and should be reversed.

Each of claims 4-6 includes, among others, limitations directed to the slinger and the seal ring. Each of these claims reflects that the slinger has an outer-diameter-side cylindrical section, the seal ring includes a first seal lip and a second seal lip which has a tip in sliding contact with the outer peripheral surface of the outer-diameter-side cylindrical section, and the amount of elastic deformation of the second seal lip, which occurs when its tip comes in contact with the outer peripheral surface of the outer-diameter-side cylindrical section, is at least 1/10 and up to 7/10 of the height of the second seal lip in a free state.

The rejection of claims 4-6 relies, in part, on the contention that any one of Takenaka et al., Repella, and Johnen discloses the limitation that the amount of elastic deformation of the second seal lip is at least 1/10 and up to 7/10 of the height of the second seal lip in a free state. Specifically, it is contended that Figures 1-4 of Takenaka et al. show 50% deformation, Figure 2 of Repella shows a 57% deformation, and Figure 1 of Johnen shows a 42% deformation. Since the text of each reference does not disclose the percentage of deformation, it is apparent that the Examiner's conclusions relating to the alleged deformation percentages are based solely by measuring the drawing features. In fact, the text of each reference does not disclose that the drawings are to scale, and is silent as to dimensions.

Section 2125 of the *Manual of Patent Examining Procedure* (MPEP) addresses the issue of drawings as prior art. *MPEP* §2125 (8th ed., Rev. 4, October 2005). MPEP §2125 has two subheadings. Under its first subheading, MPEP §2125 cites three cases, *In re Mraz*, 455 F.2d 1069, 173 USPQ 25 (CCPA 1972); *Jockmus v. Leviton*, 28 F.2d 812 (2d Cir. 1928); *In re Aslanian,* 590 F.2d 911, 200 USPQ 500 (CCPA 1979), to support the general proposition that "drawings can be used as prior art." Under its second subheading, MPEP §2125 addresses the specific issue of whether proportions of features in a drawing are evidence of actual proportions when drawings are not to scale. Regarding this specific issue, the MPEP states "arguments based on measurement of drawing features are of little value if the reference does not disclose that the drawings are to scale and is silent as to dimensions," citing *Hockerson-Halberstadt, Inc. v. Avia Group Int'l*, 222 F.3d 951, 956, 55 USPQ2d 1487, 1491 (Fed. Cir. 2000). The MPEP also cites *Nystrom v. TREX Co.*, 339 F.3d 1347 67 USPQ2d 1858 (Fed. Cir. 2003) (footnote 5: "arguments based on drawings not explicitly made to scale in issued patents are unavailing").

Therefore, the MPEP establishes that although as a general proposition drawings can be used as prior art, measurement of drawing features are of little value if the reference does not disclose that the drawings are to scale and is silent as to dimensions. No exceptions to this rule are provided in the MPEP.

In the present case, deformation percentages cannot be obtained by measuring the drawing features of the cited references, because the references do not disclose that the drawings are to scale and are silent as to dimensions. Since it has not been shown that the cited references teach or suggest that the amount of elastic deformation of the second seal lip is at least 1/10 and up to 7/10, the obviousness rejection is improper.

In the Office Action dated June 14, 2005 (see pages 2-4), the Examiner focuses on the first subheading of the MPEP §2125, which states that "drawings can be used as prior art," but apparently ignores the second subheading, which states "proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale." The Examiner cites court opinions that support the general proposition under the first subheading, but completely ignores the cases discussing the specific issue under the second subheading.

The specific rules discussed under the second subheading apply to the issue in the present case. If one simply applies the general proposition and ignores the exceptions, the exceptions are rendered meaningless. This is clearly the case in the present case. The Examiner concludes that the claimed deformation is disclosed because he believes that the drawings clearly show the deformation. Conversely, if the Examiner believed that the drawings do not clearly show the claimed deformation, it is needless to say that he would conclude that the claimed deformation is disclosed, and the rules under the second subheading of the MPEP §2125 would never get applied.

In the last Office Action, the Examiner additionally argues that each of Takenaka et al., Repella, and Johnen shows both deformed and free states in a single figure and would not show a different scale in moving from one position to another position in a single figure. This is not correct.

A figure is to scale if the *relative* sizes of the components shown in the figure are the same as those in an actual embodiment. There is no disclosure in any of Takenaka et al., Repella, and Johnen that this is the case. In other words, there is no disclosure that the size of a seal lip in a free state relative to the elastic deformation of the seal lip in the figure is the same as that in an actual embodiment.

It is respectfully submitted that there is a clear legal deficiency in the rejection set forth by the Examiner, because the correct legal standard is not used to determine whether the claim limitation--the amount of elastic deformation of the second seal lip is at least 1/10 and up to 7/10 of the height of the second seal lip in a free state--is disclosed or suggested by the cited prior art when considered as a whole.

CONCLUSION

For reasons discussed above, the rejection of claims 4-6 as unpatentable over the Nobuhiko et al. document, the Hosoda et al. document, any of the Takenaka et al., Repella, or Johnen documents, and Japanese publication 10-331,985 is erroneous and should be reversed.

If there are any questions regarding this document or the application in general, a telephone call to the undersigned would be appreciated.

If necessary to effect a timely response, this paper should be considered as a petition for an extension of time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #038920.50634D1).

Respectfully submitted,

April 28, 2006

Jeffrey D. Sanok
Registration No. 32,169
Richard R. Diefendorf
Registration No. 32,390

CROWELL & MORING LLP
Intellectual Property Group
P.O. Box 14300
Washington, DC 20044-4300
Telephone No.: (202) 624-2500
Facsimile No.: (202) 628-8844
JDS:RRD:rd

CLAIMS APPENDIX

4. A seal apparatus for a water pump provided between a non-rotating member having an inner peripheral surface and a rotating shaft of the water pump inserted into the non-rotating member and having an outer peripheral surface; comprising a seal ring having an outer peripheral edge fastened to the inner peripheral surface of the non-rotating member, and a slinger made from a metal plate and formed by bending, the slinger having an outer peripheral surface and fitted around the rotating shaft to block between the inner peripheral surface of the non-rotating member and the outer peripheral surface of the rotating shaft of the water pump, the slinger having an outer peripheral edge formed with an outer-diameter-side cylindrical section which is concentric with the rotating shaft and has an outer peripheral surface, the seal ring comprising a first seal lip that comes in sliding contact with the outer peripheral surface of the rotating shaft or with the outer peripheral surface of the slinger that rotates together with the rotating shaft, and a second seal lip that has a tip edge which comes in sliding contact with the outer peripheral surface of the outer-diameter-side cylindrical section, and that is tilted inward in the radial direction toward the tip edge thereof, wherein the amount of elastic deformation of the second seal lip, which occurs when the tip edge of the second seal lip comes in contact with the outer peripheral surface of the outer-diameter-side cylindrical section, is at least 1/10 and up to 7/10 the height of the second seal lip in a free state, and the roughness of a section of the outer peripheral surface of the outer-diameter-side cylindrical section with which the tip edge of the second seal lip

comes in sliding contact is from 0.2 μm to 2.0 μm in the arithmetic mean Ra, or is from 0.8 μm to 8.0 μm in the maximum height Ry.

5. A rotation-support apparatus for a water pump comprising: an outer ring having an inner peripheral surface formed with an outer ring raceway, a rotating shaft for the water pump having an outer peripheral surface formed with an inner ring raceway, a plurality of rolling elements rotatably located between the outer-ring raceway and inner-ring raceway, a seal ring having an outer peripheral edge fastened to the inner peripheral surface of the outer ring at one end thereof, and a slinger made from a metal plate and formed by bending, the slinger having an outer peripheral surface and fitted around the rotating shaft, the slinger having an outer peripheral edge formed with an outer-diameter-side cylindrical section which is concentric with the rotating shaft and has an outer peripheral surface, the seal ring comprising a first seal lip that comes in sliding contact with the outer peripheral surface of the rotating shaft, or with the outer peripheral surface of the slinger that rotates together with the rotating shaft, and a second seal lip that has a tip edge which comes in sliding contact with the outer peripheral surface of the outer-diameter-side cylindrical section, and that is tilted inward in the radial direction toward the tip edge thereof, wherein the amount of elastic deformation of the second seal lip, which occurs when the tip edge of the second seal lip comes in contact with the outer peripheral surface of the outer-diameter-side cylindrical section, is at least 1/10 and up to 7/10 the height of the second seal lip in a free state, and the roughness

of a section of the outer peripheral surface of the outer-diameter-side cylindrical section with which the tip edge of the second seal lip comes in sliding contact is from 0.2 μm to 2.0 μm in the arithmetic mean Ra, or is from 0.8 μm to 8.0 μm in the maximum height Ry.

6. A water pump comprising a housing having an inner peripheral surface; an outer-ring raceway that is formed directly around the inner peripheral surface of this housing or formed around a separate outer ring around the inner peripheral surface of this housing, a rotating shaft having an outer peripheral surface formed with an inner-ring raceway, a plurality of rolling elements rotatably located between the outer-ring raceway and inner-ring raceway, a seal ring having an outer peripheral edge fastened to the inner peripheral surface of the outer ring at one end thereof, a slinger made from a metal plate and formed by bending, the slinger having an outer peripheral surface and fitted around the rotating shaft, a pulley fastened to the rotating shaft at an outer end thereof, an impeller fastened to the rotating shaft at an inner end thereof, a mechanical seal provided between the inner peripheral surface of the housing and the outer peripheral surface of the rotating shaft and axially between the impeller and the slinger, and a space provided axially between the mechanical seal and the seal ring, the slinger having an outer peripheral edge formed with an outer-diameter-side cylindrical section which is concentric with the rotating shaft and has an outer peripheral surface, the seal ring comprising a first seal lip that comes in sliding contact with the outer

peripheral surface of the rotating shaft or with the outer peripheral surface of the slinger that rotates together with the rotating shaft, and a second seal lip that has a tip edge which comes in sliding contact with the outer peripheral surface of the outer-diameter-side cylindrical section, and that is tilted inward in the radial direction toward the tip edge thereof, wherein the amount of elastic deformation of the second seal lip, which occurs when the tip edge of the second seal lip comes in contact with the outer peripheral surface of the outer-diameter-side cylindrical section, is at least 1/10 and up to 7/10 the height of the second seal lip in a free state, and the roughness of a section of the outer peripheral surface of the outer-diameter-side cylindrical section with which where the tip edge of the second seal lip comes in sliding contact is from 0.2 μm to 2.0 μm in the arithmetic mean Ra, or is from 0.8 μm to 8.0 μm in the maximum height Ry.

EVIDENCE APPENDIX

None.

RELATED APPEALS APPENDIX

None.